

IN THE CLAIMS:

1. (original) A method of detecting fast neutrons of energy greater than 5MeV comprising the steps of:

providing a neutron detector comprising a plate having a plurality of microchannels or like detection sites disposed thereon which produce an electron output;

directly coupling said neutron detector to an electron detector without an intermediate scintillator layer;

positioning the neutron detector so that neutrons are incident on said neutron detector; and,

detecting the output of the electron detector.

2. (currently amended) A method according to claim 1 ~~in which~~ wherein the neutron detector is a microchannel plate.

3. (currently amended) A method according to claim 1 ~~in which~~ wherein the neutron detector is a microsphere or microfibre plate.

4. (currently amended) A method according to ~~any of claims 1 to 3 in which~~ claim 1 wherein in which the area of the neutron detector upon which the detected neutrons are incident is greater than $1.0 \times 10^{-2} \text{m}^2$, preferably greater than $5.0 \times 10^{-2} \text{m}^2$, more preferably greater than $5.0 \times 10^{-1} \text{m}^2$, most preferably greater than $6.0 \times 10^{-1} \text{m}^2$.

5. (currently amended) A method according to ~~any of claims 1 to 4 in which~~ claim 1 wherein the electron detector is without an entrance window, thereby permitting direct accumulation of electron charge from the neutron detector on the electron detector.

6. (currently amended) A method according to ~~any previous in which~~ claim 1 wherein the electron detector comprises a pixel array detector.

7. (currently amended) A method according to claim 6 ~~in which~~ wherein the electron detector comprises an amorphous silicon or an amorphous selenium pixel array detector.

8. (currently amended) A method according to ~~any previous in which~~ claim 1 wherein the neutron detector comprises greater than 45% by weight of silicon, preferably greater than 90%.

9. (currently amended) A method of detecting and imaging neutrons according to ~~any previous in which~~, claim 1 wherein the step of detecting the output of the electron detector

comprises assembling outputs from different discrete areas of the electron detector in order to produce an image of neutrons incident on ~~said~~ the neutron detector.

10. (currently amended) A method according to ~~any previous in which~~ claim 1 wherein the neutron detector comprises an array of individual plate devices.

11. (currently amended) A detection device for detecting radiation such as neutrons and X-rays comprising a neutron detector directly coupled to a pixel array electron detector, ~~in which~~ wherein the radiation detector comprises a plate having a plurality of microchannel or like detection sites disposed thereon which produce an electron output, and the radiation detector is directly coupled to the electron detector without an intermediate scintillator layer.

12. (currently amended) A device according to claim 11 ~~in which~~ wherein the radiation detector is a microchannel plate.

13. (currently amended) A device according to claim 11 ~~in which~~ wherein the radiation detector is a microsphere or microfibre plate.

14. (currently amended) A device according to any of ~~claims 11 to 13 in which~~ claim 11 wherein the electron detector is an amorphous silicon or amorphous selenium pixel array detector.

15. (currently amended) A device according to ~~any of claims 11 to 14 in which~~ claim 11 wherein the electron detector is without an entrance window thereby permitting direct accumulation of electron charge from the radiation detector on the electron detector.

16. (currently amended) A device according to ~~any of claims 11 to 15 in which~~ Claim 11 wherein the radiation detector has a front face upon which radiation is incident, and the surface area of said front face is greater than $1.0 \times 10^{-2} \text{m}^2$, preferably greater than $5 \times 10^{-2} \text{m}^2$, more preferably greater than $5.0 \times 10^{-1} \text{m}^2$, most preferably greater than $6.0 \times 10^{-1} \text{m}^2$.

17. (currently amended) A device according to ~~any of claims 11 to 16~~ claim 11 for imaging radiation such as neutrons and X-rays, the device further comprising imaging means for assembling outputs from different discrete areas of the electron detector in order to produce an image of radiation incident on said radiation detector.

18. (currently amended) ~~Use of a~~ A device according to ~~any of claims 11 to 17~~ claim 11 to image neutrons.

19. (currently amended) ~~Use~~ A device according to claim 18 useful to image fast neutrons of energy greater than 5MeV.

20. (currently amended) ~~Use in the~~ A device for imaging of fast neutrons of energy greater than 5MeV, ~~the of a~~ device comprising a neutron detector directly coupled to an electron detector without an intermediate scintillator layer, the neutron detector comprising a plate having a plurality of microchannels or like detection sites disposed thereon which produce an electron output.